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Remarks: General

Claim 82 has been amended with respect to matters of form. No new matter is added by the amendment.

Applicant respectfully requests the Examiner to initial the references listed on Form PTO SB/08A contained in the Information Disclosure Statement ("IDS") previously submitted by Applicant under date of October 16, 2006.

A request for continued examination under 37 CFR §1.114 is enclosed, the fee for which should be charged to Deposit Account No. 04-1928 (E.I. du Pont de Nemours and Company).

If any fee other than or in addition to that mentioned specifically above is required to authorize or obtain consideration of this response or the IDS, please charge such fee to Deposit Account No. 04-1928.

Claims 7, 14~24, 42, 45~51 and 67~109 remain active in the application. Applicant hereby requests reconsideration and further examination of the application in view of the reasons it has set forth below for allowance of the claims.

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Remarks: Detailed Action

The Examiner has objected to Claim 82 as being a substantial duplicate of Claim 7.

Claim 82 has been amended to limit it to a portion of the Markush group recited in Claim 7. The full Markush group recited in Claim 7 is phrased as follows:

wherein the particulates are selected from the group consisting of zinc, thallium, germanium, cadmium, indium, tin, antimony, lead, bismuth; and alloys of metals and metalloids

Claim 82 as amended is directed to the following portion of the Markush group

zinc, thallium, germanium, cadmium, indium; tin, antimony, lead and bismuth


and Claim 83 is directed to the remaining portion of the Markush group, as follows:

alloys of metals and metalloids.

It is submitted therefore that the scope of Claims 7 and 82 differ since Claim 82 does not recite the full Markush group. In view of the foregoing, Applicant respectfully requests that the Examiner withdraw the objection to Claim 82.

In view of the foregoing, Applicant submits that all of the Examiner's objections and rejections have been properly traversed, and that the pending claims are in condition for allowance, request for which is hereby respectfully made.

Respectfully submitted,



John A. Langworthy

Attorney for Applicant

Registration No. 32,255

Telephone: (302) 992-4362

Facsimile: (302) 992-5374

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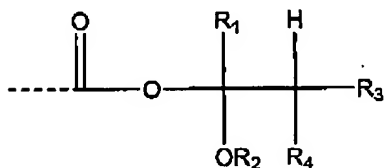
Appendix A

(i) Amendments
 in marked-up form to
 Claim 82 and;

(ii) Status of all pending claims
 (7, 14-24, 42, 45-51 and 67-109).

1 ~ 6. (cancelled).

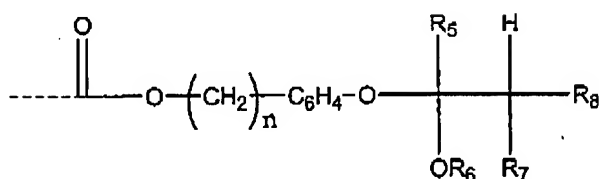
7. (previously presented) A positive imageable, particulate-filled photoresist composition comprising (a) at least one positive imageable photopolymer system, and (b) about 1 to about 70 vol% particulates, wherein the particulates are selected from the group consisting of zinc, thallium, germanium, cadmium, indium, tin, antimony, lead, bismuth; and alloys of metals and metalloids; and wherein the photopolymer system comprises a (meth)acrylate polymer or copolymer that comprises one or more of the pendant groups as described by Formulae I, II and III, to-wit:



Formula I

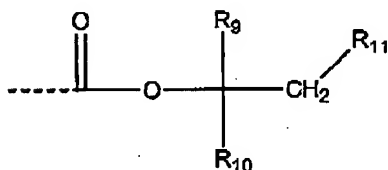
wherein R₁ is hydrogen or C₁-C₆ alkyl; R₂ is C₁-C₆ alkyl; and R₃ and R₄ independently are hydrogen or C₁-C₆ alkyl; and wherein R₁ and R₂, or R₁ and R₃, or R₂ and R₃ may be joined to form a 5-, 6-, or 7-membered ring;

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Formula II

wherein n is 0-4; R_5 is hydrogen or C_1 - C_6 alkyl; R_6 is C_1 - C_6 alkyl; and R_7 and R_8 independently are hydrogen or C_1 - C_6 alkyl; and wherein R_5 and R_6 , or R_5 and R_7 , or R_6 and R_7 may be joined to form a 5-, 6-, or 7-membered ring; and



Formula III

wherein R_9 is hydrogen or lower alkyl; R_{10} is lower alkyl; and R_{11} is hydrogen or lower alkyl; and wherein a lower alkyl group includes alkyl groups having 1 to 6 linear or 3 to 6 cyclic carbon atoms.

8 ~ 13. (cancelled).

14. (previously presented) The composition of Claim 7 further comprising additives selected from the group consisting of solvents and viscosity aids.

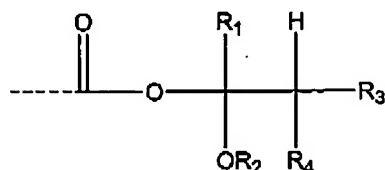
15. (previously presented) The composition of Claim 7 wherein the particulates comprise about 20 to about 70 vol% of the composition.

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16. (previously presented) The composition of Claim 7 wherein the particulates are less than 100 microns in their longest dimension.

17. (previously presented) The composition of Claim 7 wherein the particulates are less than 10 microns in their longest dimension.

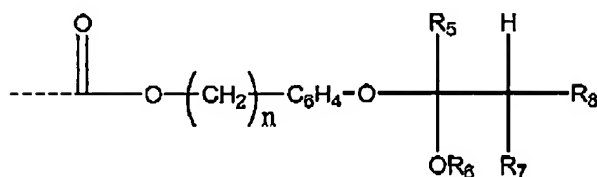
18. (previously presented) A printable paste comprising a positive imageable, particulate-filled photoresist composition that comprises (a) at least one positive imageable photopolymer system, and (b) about 1 to about 70 vol% particulates, wherein the photopolymer system comprises a (meth)acrylate polymer or copolymer that comprises one or more of the pendant groups as described by Formulae I, II and III, to-wit:



Formula I

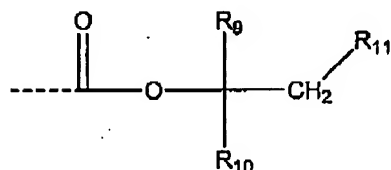
wherein R₁ is hydrogen or C₁-C₆ alkyl; R₂ is C₁-C₆ alkyl; and R₃ and R₄ independently are hydrogen or C₁-C₆ alkyl; and wherein R₁ and R₂, or R₁ and R₃, or R₂ and R₃ may be joined to form a 5-, 6-, or 7-membered ring;

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Formula II

wherein n is 0-4; R₅ is hydrogen or C₁-C₆ alkyl; R₆ is C₁-C₆ alkyl; and R₇ and R₈ independently are hydrogen or C₁-C₆ alkyl; and wherein R₅ and R₆, or R₅ and R₇, or R₆ and R₇ may be joined to form a 5-, 6-, or 7-membered ring; and



Formula III

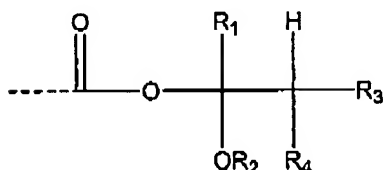
wherein R₉ is hydrogen or lower alkyl; R₁₀ is lower alkyl; and R₁₁ is hydrogen or lower alkyl; and wherein a lower alkyl group includes alkyl groups having 1 to 6 linear or 3 to 6 cyclic carbon atoms.

19. (previously presented) The printable paste of Claim 18 in the form of a film.

20. (previously presented) An electron field emitting film comprising a positive imageable, particulate-filled photoresist composition that comprises (a) at least one positive imageable photopolymer system, and (b) about 1 to about 70 vol% particulates, wherein the photopolymer system comprises a (meth)acrylate polymer

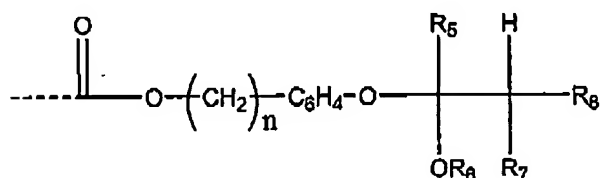
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or copolymer that comprises one or more of the pendant groups as described by Formulae I, II and III, to-wit:



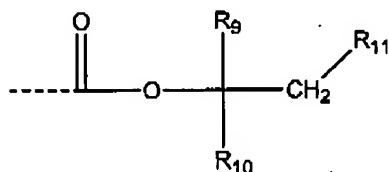
Formula I

wherein R₁ is hydrogen or C₁-C₆ alkyl; R₂ is C₁-C₆ alkyl; and R₃ and R₄ independently are hydrogen or C₁-C₆ alkyl; and wherein R₁ and R₂, or R₁ and R₃, or R₂ and R₃ may be joined to form a 5-, 6-, or 7-membered ring;



Formula II

wherein n is 0-4; R₅ is hydrogen or C₁-C₆ alkyl; R₆ is C₁-C₆ alkyl; and R₇ and R₈ independently are hydrogen or C₁-C₆ alkyl; and wherein R₅ and R₆, or R₅ and R₇, or R₆ and R₇ may be joined to form a 5-, 6-, or 7-membered ring; and



Formula III

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wherein R₉ is hydrogen or lower alkyl; R₁₀ is lower alkyl; and R₁₁ is hydrogen or lower alkyl; and wherein a lower alkyl group includes alkyl groups having 1 to 6 linear or 3 to 6 cyclic carbon atoms.

21. (original) A field emission triode comprising the film of Claim 20.

22. (original) A field emission display comprising the film of Claim 20.

23. (original) A lighting device comprising the film of Claim 20.

24. (original) A vacuum electronic device comprising the film of Claim 20.

25-41. (canceled)

42. (previously presented) . A positive imageable, particulate-filled photoresist composition comprising (a) at least one positive imageable photopolymer system that comprises a novolac-diazonaphthoquinone resin, and (b) about 1 to about 70 vol% carbon nanotubes.

43 - 44. (cancelled).

45. (previously presented) The composition of Claim 42 further comprising additives selected from the group consisting of solvents and viscosity aids.

46. (previously presented) The composition of Claim 42 wherein the carbon nanotubes comprise about 20 to about 70 vol% of the composition.

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47. (previously presented) The composition of Claim 42 wherein the carbon nanotubes are less than 100 microns in their longest dimension.

48. (previously presented) The composition of Claim 42 wherein the carbon nanotubes are less than 10 microns in their longest dimension.

49. (previously presented) The composition of Claim 42 in the form of a printable paste or a film.

50. (previously presented) An electron field emitting film comprising a positive imageable, particulate-filled photoresist composition that comprises (a) at least one positive imageable photopolymer system, and (b) about 1 to about 70 vol% carbon nanotubes.

51. (previously presented) A field emission triode, a field emission display, a lighting device, or a vacuum electronic device comprising the film of Claim 50.

52 ~ 66. (cancelled).

67. (previously presented) A lighting device or a vacuum electronic device that comprises an electron field emitting film that comprises a positive imageable, particulate-filled photoresist composition comprising (a) at least one positive imageable photopolymer system, and (b) about 1 to about 70 vol% particulates.

68. (previously presented) The device of Claim 67 wherein the particulates are selected from the group consisting of glass, oxides, carbides, nitrides, metals, metal alloys, metalloids, metalloid alloys, alloys of metals and metalloids, carbon and mixtures thereof.

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69. (previously presented) The device of Claim 68 wherein the oxides are selected from the group consisting of aluminum oxides, silicon oxides, tin oxides and mixtures thereof.

70. (previously presented) The device of Claim 67 wherein the particulates are selected from the group consisting of transition metals and their alloys.

71. (previously presented) The device of Claim 70 wherein the transition metals are selected from the group consisting of Al, Cu, Ag, Au, Pt, and Pd.

72. (previously presented) The device of Claim 67 wherein the particulates are selected from the group consisting of zinc, thallium, germanium, cadmium, indium, tin, antimony, lead, bismuth, and their alloys.

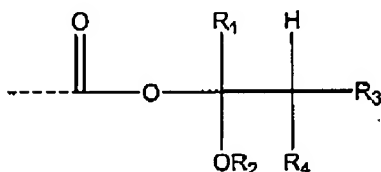
73. (previously presented) The device of Claim 67 wherein the particulates are selected from the group consisting of alloys of metals and metalloids.

74. (previously presented) The device of Claim 73 wherein the carbon is in the form of carbon nanotubes.

75. (previously presented) The device of Claim 67 wherein the photopolymer system is selected from the group consisting of novolac-diazonaphthoquinone resins.

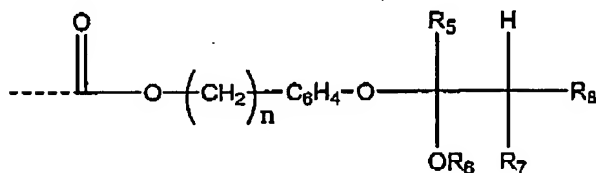
76. (previously presented) The device of Claim 67 wherein the photopolymer system comprises a (meth)acrylate polymer or copolymer that comprises one or more of the pendant groups as described by Formulae I, II and III, to-wit:

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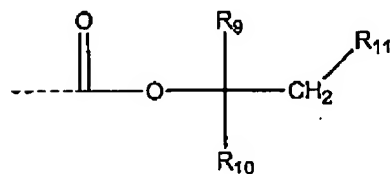
Formula I

wherein R₁ is hydrogen or C₁-C₆ alkyl; R₂ is C₁-C₆ alkyl; and R₃ and R₄ independently are hydrogen or C₁-C₆ alkyl; and wherein R₁ and R₂, or R₁ and R₃, or R₂ and R₃ may be joined to form a 5-, 6-, or 7-membered ring.



Formula II

wherein n is 0-4; R₅ is hydrogen or C₁-C₆ alkyl; R₆ is C₁-C₆ alkyl; and R₇ and R₈ independently are hydrogen or C₁-C₆ alkyl; and wherein R₅ and R₆, or R₅ and R₇, or R₆ and R₇ may be joined to form a 5-, 6-, or 7-membered ring.



Formula III

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wherein R_9 is hydrogen or lower alkyl; R_{10} is lower alkyl; and R_{11} is hydrogen or lower alkyl; and wherein a lower alkyl group includes alkyl groups having 1 to 6 linear or 3 to 6 cyclic carbon atoms.

77. (previously presented) The device of Claim 67 wherein the photopolymer system comprises acid labile monomeric components selected from:

- tetrahydropyranyl methacrylate (or acrylate);
- tetrahydropyranyl p-vinylbenzoate;
- 1-ethoxy-1-propyl p-vinylbenzoate;
- 4-(2-tetrahydropyranyloxy)benzyl methacrylate (or acrylate);
- 4-(1-butoxyethoxy)benzyl methacrylate (or acrylate);
- t-butyl methacrylate (or acrylate);
- neopentyl methacrylate (or acrylate);
- 1-bicyclo{2,2,2}octyl methacrylate (or acrylate) and their derivatives;
- 1-bicyclo{2,2,1}heptyl methacrylate (or acrylate) and their derivatives;
- 1-bicyclo{2,1,1}hexyl methacrylate (or acrylate) and their derivatives;
- 1-bicyclo{1,1,1}pentyl methacrylate (or acrylate) and their derivatives; and
- 1-adamantyl methacrylate (or acrylate) and their derivatives.

78. (previously presented) The device of Claim 67 wherein the composition further comprises additives selected from the group consisting of solvents and viscosity aids.

79. (previously presented) The device of Claim 67 wherein the particulates comprise about 20 to about 70 vol% of the composition.

80. (previously presented) The device of Claim 67 wherein the particulates are less than 100 microns in their longest dimension.

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81. (previously presented) The device of Claim 67 wherein the particulates are less than 10 microns in their longest dimension.

82. (currently amended) The composition of Claim 7 wherein the particulates are selected from the group consisting of zinc, thallium, germanium, cadmium, indium, tin, antimony, lead, and bismuth, ~~and their alloys~~.

83. (previously presented) The composition of Claim 7 wherein the particulates are selected from the group consisting of alloys of metals and metalloids.

84. (previously presented) The composition of Claim 7 wherein the photopolymer system comprises acid labile monomeric components selected from:

- tetrahydropyranyl methacrylate (or acrylate);
- 4-(2-tetrahydropyranyloxy)benzyl methacrylate (or acrylate);
- 4-(1-butoxyethoxy)benzyl methacrylate (or acrylate);
- t-butyl methacrylate (or acrylate);
- neopentyl methacrylate (or acrylate);
- 1-bicyclo{2,2,2}octyl methacrylate (or acrylate) and their derivatives;
- 1-bicyclo{2,2,1}heptyl methacrylate (or acrylate) and their derivatives;
- 1-bicyclo{2,1,1}hexyl methacrylate (or acrylate) and their derivatives;
- 1-bicyclo{1,1,1}pentyl methacrylate (or acrylate) and their derivatives; and
- 1-adamantyl methacrylate (or acrylate) and their derivatives.

85. (previously presented) The composition of Claim 7 in the form of a printable paste or a film.

86. (previously presented) An electron field emitting film comprising the composition of Claim 7.

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87. (previously presented) A field emission triode, a field emission display, a lighting device, or a vacuum electronic device comprising the film of Claim 86.

88. (previously presented) The printable paste of Claim 18 wherein the particulates are selected from the group consisting of glass, oxides, carbides, nitrides, metals, metal alloys, metalloids, metalloid alloys, metal/metalloid alloys, carbon and mixtures thereof.

89. (previously presented) The printable paste of Claim 88 wherein the metals are selected from the group consisting of Al, Cu, Ag, Au, Pt, and Pd.

90. (previously presented) The printable paste of Claim 88 wherein the carbon is in the form of carbon nanotubes.

91. (previously presented) The printable paste of Claim 18 wherein the photopolymer system comprises acid labile monomeric components selected from:

- tetrahydropyranyl methacrylate (or acrylate);
- 4-(2-tetrahydropyranyloxy)benzyl methacrylate (or acrylate);
- 4-(1-butoxyethoxy)benzyl methacrylate (or acrylate);
- t-butyl methacrylate (or acrylate);
- neopentyl methacrylate (or acrylate);
- 1-bicyclo{2,2,2}octyl methacrylate (or acrylate) and their derivatives;
- 1-bicyclo{2,2,1}heptyl methacrylate (or acrylate) and their derivatives;
- 1-bicyclo{2,1,1}hexyl methacrylate (or acrylate) and their derivatives;
- 1-bicyclo{1,1,1}pentyl methacrylate (or acrylate) and their derivatives; and
- 1-adamantyl methacrylate (or acrylate) and their derivatives.

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92. (previously presented) The printable paste of Claim 18 wherein the particulates comprise about 20 to about 70 vol% of the composition.

93. (previously presented) The printable paste of Claim 18 wherein the particulates are less than 100 microns in their longest dimension.

94. (previously presented) The printable paste of Claim 18 wherein the particulates are less than 10 microns in their longest dimension.

95. (previously presented) The film of Claim 20 wherein the particulates are selected from the group consisting of glass, oxides, carbides, nitrides, metals, metal alloys, metalloids, metalloid alloys, metal/metalloid alloys, carbon and mixtures thereof.

96. (previously presented) The film of Claim 95 wherein the metals are selected from the group consisting of Al, Cu, Ag, Au, Pt, and Pd.

97. (previously presented) The film of Claim 95 wherein the carbon is in the form of carbon nanotubes.

98. (previously presented) The film of Claim 20 wherein the photopolymer system comprises acid labile monomeric components selected from:

- tetrahydropyranyl methacrylate (or acrylate);
- 4-(2-tetrahydropyranyloxy)benzyl methacrylate (or acrylate);
- 4-(1-butoxyethoxy)benzyl methacrylate (or acrylate);
- t-butyl methacrylate (or acrylate);
- neopentyl methacrylate (or acrylate);
- 1-bicyclo{2,2,2}octyl methacrylate (or acrylate) and their derivatives;
- 1-bicyclo{2,2,1}heptyl methacrylate (or acrylate) and their derivatives;

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1-bicyclo{2,1,1}hexyl methacrylate (or acrylate) and their derivatives;

1-bicyclo{1,1,1}pentyl methacrylate (or acrylate) and their derivatives; and

1-adamantyl methacrylate (or acrylate) and their derivatives.

99. (previously presented) The film of Claim 20 wherein the particulates comprise about 20 to about 70 vol% of the composition.

100. (previously presented) The film of Claim 20 wherein the particulates are less than 100 microns in their longest dimension.

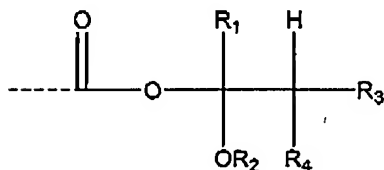
101. (previously presented) The film of Claim 20 wherein the particulates are less than 10 microns in their longest dimension.

102. (previously presented) An electron field emitting film comprising the composition of Claim 42.

103. (previously presented) A field emission triode, a field emission display, a lighting device, or a vacuum electronic device comprising the film of Claim 102.

104. (previously presented) The film of Claim 50 wherein the photopolymer system is selected from the group consisting of novolac-diazonaphthoquinone resins.

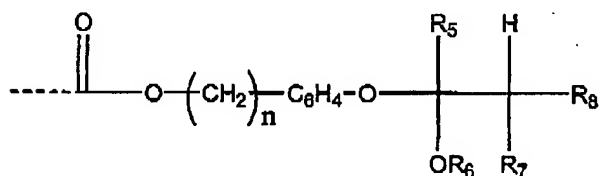
105. (previously presented) The film of Claim 50 wherein the photopolymer system comprises a (meth)acrylate polymer or copolymer that comprises one or more of the pendant groups as described by Formulae I, II and III, to-wit:



Formula I

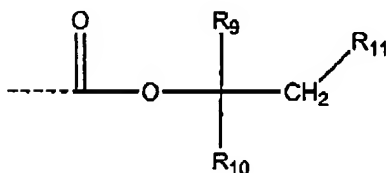
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wherein R_1 is hydrogen or C_1 - C_6 alkyl; R_2 is C_1 - C_6 alkyl; and R_3 and R_4 independently are hydrogen or C_1 - C_6 alkyl; and wherein R_1 and R_2 , or R_1 and R_3 , or R_2 and R_3 may be joined to form a 5-, 6-, or 7-membered ring.



Formula II

wherein n is 0-4; R_5 is hydrogen or C_1 - C_6 alkyl; R_6 is C_1 - C_6 alkyl; and R_7 and R_8 independently are hydrogen or C_1 - C_6 alkyl; and wherein R_5 and R_6 , or R_5 and R_7 , or R_6 and R_7 may be joined to form a 5-, 6-, or 7-membered ring.



Formula III

wherein R_9 is hydrogen or lower alkyl; R_{10} is lower alkyl; and R_{11} is hydrogen or lower alkyl; and wherein a lower alkyl group includes alkyl groups having 1 to 6 linear or 3 to 6 cyclic carbon atoms.

106. (previously presented) The film of Claim 50 wherein the photopolymer system comprises acid labile monomeric components selected from:

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tetrahydropyranyl methacrylate (or acrylate);
4-(2-tetrahydropyranyloxy)benzyl methacrylate (or acrylate);
4-(1-butoxyethoxy)benzyl methacrylate (or acrylate);
t-butyl methacrylate (or acrylate);
neopentyl methacrylate (or acrylate);
1-bicyclo{2,2,2}octyl methacrylate (or acrylate) and their
derivatives;
1-bicyclo{2,2,1}heptyl methacrylate (or acrylate) and their
derivatives;
1-bicyclo{2,1,1}hexyl methacrylate (or acrylate) and their
derivatives;
1-bicyclo{1,1,1}pentyl methacrylate (or acrylate) and their
derivatives; and
1-adamantyl methacrylate (or acrylate) and their derivatives.

107. (previously presented) The film of Claim 50 wherein the carbon nanotubes comprise about 20 to about 70 vol% of the composition.

108. (previously presented) The film of Claim 50 wherein the carbon nanotubes are less than 100 microns in their longest dimension.

109. (previously presented) The film of Claim 50 wherein the carbon nanotubes are less than 10 microns in their longest dimension.